tive material such as copper and has an exposed outer surface **48** that allows the heat generated by the integrated circuit **12** to be removed from the package **10**. In the preferred embodiment, an electrically or thermally conductive epoxy or adhesive **49** is placed between the integrated circuit **12** and the heat slug **46** to reduce the resistance of the thermal path between the circuit **12** and the slug **46**. The second circuit board **32** may also be mounted to a heat spreader **50** that provides a hard outer surface for the package and a thermal path for the heat generated by the electronic devices **38***a* and **38***b*. The heat spreader **50** may have slots **52** which allow the devices **38***a* and **38***b* to be removed from the package **10**. A plastic encapsulant **54** is injected into the space between the first **18** and second **32** circuit boards to protect the devices **38***a* and **38***b* and add structural integrity to the package **10**.

To assemble the package **10**, the integrated circuit **12** is mounted to the first circuit board **18** and the first pins **26** are attached to the plated through holes **24**. The pins **12** are pre-assembled into the plastic element **20**, which is coupled to the board **18**. The lid **28** can be attached to the substrate **16** to partially enclose the integrated circuit **12**.

The devices **38***a* and **38***b* and second pins **34** are attached to the second circuit board **32** which is bonded to the heat sink **50**. The first circuit board subassembly and the second circuit board subassembly can be tested to detect any defects in either the devices **38***a* and **38***b*, circuit **12** or the subassemblies. After testing, the second pins **34** are attached to the first circuit board **18**. The heat slug **46** is then mounted to the first circuit board **18** and the integrated circuit **12**. After assembly of the heat slug **46**, the encapsulant **54** is injected into the space between the circuit boards **18** and **32**.

FIGS. **3** and **4** show an alternate embodiment of the package. The heat sink **100** may have fins **102** and a slot **104** that receives the heat slug **46**. The base of the heat sink **100** may have a through hole **106** that allows adhesive to be applied to the top surface of the slug **46**. The heat sink **100** may also have slots **108** that capture the ends of the second pins **32**. The second pins **34** may extend through the substrate **110** to directly couple the second circuit board **32** and devices **38***a* and **38***b* to the external printed circuit board. The second pins **34** that extend through the substrate **110** may couple the devices **38***a* and **38***b* to the external circuit board without reducing the number of first pins **26** dedicated to the integrated circuit **12**. If the devices **38***a* and **38***b* include a power control device such as a voltage regulator or a power converter, the second pins **34** that extend through the substrate **16** may be dedicated to power and ground. Although encapsulant **54** has been described as being injected after the second pins **34** are connected to the first circuit board **18**, it is to be understood that the plastic molding may be formed before the second pins **34** are connected to the board **18**.

While certain exemplary embodiments have been described and shown in the accompanying drawings, it is to be understood that such embodiments are merely illustrative of an not restrictive on the broad invention, and that this invention not be limited to the specific constructions that arrangements shown and described, since various other modifications may occur to those ordinarily skilled in the art.

What is claimed is:

1. An electronic package, comprising:

a first circuit board;

a plurality of first pins that terminate at and extend from said first circuit board;

an integrated circuit coupled to said first pins;

a second circuit board that has a slot;

a heat slug that is located within said slot of said second circuit board and is coupled to said integrated circuit;

at least one electrical element mounted to said second circuit board; and,

a plurality of second pins coupled to said electrical element, said second pins terminate at said second circuit board and extend into said first circuit board.

2. The electronic package as recited in claim 1, wherein at least one second pin extends through said first circuit board.

3. The electronic package as recited in claim 1, further comprising a heat sink attached to said heat slug and said second circuit board.

4. The electronic package as recited in claim 1, further comprising a plastic element that captures said first pins.

5. The electronic package as recited in claim 3, wherein said heat slug is located within a slot of said heat sink.

6. The electronic package as recited in claim 1, wherein said second circuit board is mounted to a heat sink.

7. The electronic package as recited in claim 1, further comprising an encapsulant between said first and second circuit boards.

8. The electronic package as recited in claim 1, wherein said electrical element is passive.

9. The electronic package as recited in claim 1, wherein said electrical element is a voltage regulator.

10. The electronic package as recited in claim 1, wherein said electrical element is a power converter.

11. The electronic package as recited in claim 4, further comprising a lid that is mounted to said plastic element and which encloses said integrated circuit.

[* * * * *]

12. An electronic package, comprising:

a first circuit board;

a plurality of first pins that terminate at and extend from said first circuit board on a side of the first circuit board opposite a second circuit board, the first circuit board is communicatively coupled to the plurality of first pins;

an integrated circuit coupled to said first pins;

the second circuit board including a slot;

a heat slug that is located within said slot of said second circuit board and coupled to said integrated circuit; and

at least one electrical element mounted to said second circuit board,

wherein the at least one electrical element is a power circuit supplying power to the integrated circuit,

power supplied to the first circuit board is provided by a plurality of second pins,

the plurality of second pins are coupled to said electrical element,

said second pins terminate at said second circuit board and extend into said first circuit board,

said second pins are disposed between the first circuit board and the second circuit board, and

said second pins are configured to physically separably and electrically couple the second circuit board and the first circuit board.

13. The electronic package as recited in claim 12, wherein the integrated circuit is a power dissipating element, and the circuit is a power conditioning circuit.

14. The electronic package as recited in claim 13, wherein the power dissipating element is a processor.

15. The electronic package as recited in claim 12, wherein:

the second circuit board comprises a second circuit board first conductive surface and the first circuit board comprises a first circuit board first conductive surface; and

the plurality of second pins are disposed between and in electrical contact with the second circuit board first conductive surface and the first circuit board first conductive surface.

16. The electronic package as recited in claim 12, wherein:

the second circuit board comprises a second circuit board first conductive surface and a second circuit board second conductive surface;

the first circuit board comprises a first circuit board first conductive surface and a first circuit board second conductive surface; and

the plurality of second pins comprises a first portion disposed between the second circuit board first conductive surface and the first circuit board first conductive surface, and a second portion disposed between the second circuit board second conductive surface and the first circuit board second conductive surface.

17. The electronic package as recited in claim 12, wherein the plurality of second pins includes a first portion and a second portion.

18. The electronic package as recited in claim 13, wherein the plurality of second pins are disposed proximate the periphery of the power dissipating element and between the second circuit board and the first circuit board.

19. The electronic package as recited in claim 14, wherein the first circuit board is communicatively coupled to a plurality of pins, the pins communicatively coupleable to a computer motherboard, and

the plurality of pins exclude a pin providing power to the component.

20. The electronic package as recited in claim 14, wherein all power supplied to the processor is provided via the at least one conductive interconnect device.

21. The electronic package as recited in claim 12, wherein the plurality of second pins substantially surround the integrated circuit.

22. The electronic package as recited in claim 12, wherein the circuit is a voltage regulator or a power converter that controls the power delivered to the integrated circuit.

23. A modular circuit board assembly, comprising:

a substrate, having a component mounted thereon;

a circuit board, including a power circuit supplying power to the component;

at least one conductive interconnect device disposed between the substrate and the circuit board, the conductive interconnect device for physically separably and electrically coupling the circuit board to the substrate;

wherein the substrate is communicatively coupled to a plurality of signal conductors disposed on a side of the substrate opposite the circuit board; and

wherein substantially all power supplied to the substrate is provided by the at least one conductive interconnect device.

* * * * * *